

CLAIMS

1. A fast light-off catalytic reformer comprising:
 a catalytic reformer characterized by at least one reactor tube,
 said reactor tube having an inlet in a first end for receiving a flow of fuel and
 a flow of air, a reforming catalyst disposed within said reactor tube for
 5 converting said fuel and said air to a reformat stream, and an outlet in a
 second end for discharging said reformat stream;
 an ignition device disposed within said reactor tube for
 initiating an exothermic reaction between said fuel and said air and using heat
 generated thereby to provide fast light-off of said reforming catalyst; and;
 10 a control system for selecting fuel and air flow rate and
 operating said ignition device so as to achieve fast light-off of said reforming
 catalyst at start-up and to maintain said catalyst at a temperature sufficient to
 optimize reformat yield.

2. The reformer of claim 1, wherein said ignition device
 disposed within said reactor tube is located upstream of said reforming
 catalyst, ~~within said reforming catalyst~~ at the front face of said reforming
 catalyst, ~~or~~ ^{or} within said reforming catalyst at the rear face of said reforming
 5 catalyst.

3. The reformer of claim 1, wherein said ignition device
 comprises a catalytic substrate or a non-catalytic substrate for receiving
 electric current from a voltage source, a spark plug, a glow plug, or a
 combination thereof.

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4. A power generation system employing a fast light-off reformer comprising:

5 a catalytic reformer characterized by at least one reactor tube, said reactor tube having an inlet in a first end for receiving a flow of fuel and a flow of air, a reforming catalyst disposed within said reactor tube for converting said fuel and said air to a reformat stream, and an outlet in a second end for discharging said reformat stream;

10 an ignition device disposed within said reactor tube for initiating an exothermic reaction between said fuel and said air and using heat energy generated thereby to provide fast light-off of said reforming catalyst;

a control system for selecting fuel and air flow rate and operating said ignition device so as to achieve fast light-off of said reforming catalyst at start-up and to maintain said catalyst at a temperature sufficient to optimize reformat yield; and

15 a power generation system operating at least partially on reformat fueling, said power generation system having a fuel inlet in fluid communication with said reformer outlet.

5. The fast light-off reformer-power generation system of claim 4, wherein said power generation system is an engine, a spark ignition engine, a hybrid vehicle, a diesel engine, a fuel cell, a solid oxide fuel cell, or a combination thereof.

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6. A fast light-off reforming method comprising:

5 supplying a flow of fuel and a flow of air to a catalytic reformer, said catalytic reformer characterized by at least one reactor tube having an inlet for receiving said flow of fuel and air, a reforming catalyst disposed within said reactor tube for converting said flow of fuel and air to a reformat stream, and an outlet for discharging said reformat stream;

igniting said fuel and air within said reactor tube to rapidly heat said reforming catalyst with heat energy generated thereby; and

controlling said fuel and air supply and said igniting so as to
 10 achieve fast light-off of said reforming catalyst at start-up and to maintain said reforming catalyst at a temperature sufficient to optimize reformat yield.

7. The method of claim 6, wherein said igniting is with an ignition device selected from the group consisting of a catalytic or non-catalytic substrate for receiving an electric current, a spark plug, a glow plug, or a combination thereof.

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8. The method of claim 7, wherein said substrate is wire or gauze of catalytic or non-catalytic materials.

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9. The method of claim 6, further comprising:
 fueling a power generation system at least partially with said reformat stream.

10. The method of claim 9, wherein said power generation system is an engine, a spark ignition engine, a hybrid vehicle, a diesel engine, a fuel cell, a solid oxide fuel cell, or a combination thereof.